

Claims

[c1] What is claimed is:

1. A method of manufacturing an air permeable packaging bag, the method comprising:
providing a polymer composite layer, the polymer composite layer comprising a first part and a second part;
performing an impression process to form a plurality of gaps on the polymer composite layer, each of the gaps comprising two edges in contact with each other to form a closed gap when a pressure difference between the two sides of the composite film is approximately zero
wherein when the pressure difference between the two sides of the composite film increases, each of the gaps are enlarged by the air pressure exerted on one side of the composite film and become air permeable, and restore again while the pressure difference is removed;
folding the polymer composite layer to overlap the first part against the second part; and
performing a sealing process to seal the overlapping edge of the first part and second part so as to form an opening of the air permeable packaging bag.

[c2] 2. The method of claim 1 wherein the method further

comprises a step to form a sealing layer on the polymer surface of the composite layer.

- [c3] 3. The method of claim 2 wherein the sealing layer is formed after the impression process, and the sealing layer formed on the polymer composite layer fills the gaps of the polymer composite layer to prevent air permeation.
- [c4] 4. The method of claim 2 wherein the sealing layer is formed before the impression process, and the method further comprises a thermal process to soften the sealing layer after the impression process, so that the sealing layer can fill the gaps in the polymer composite layer to prevent air permeation.
- [c5] 5. The method of claim 2 further comprising a second coating process to form a second sealing layer on the other side of the polymer composite layer.
- [c6] 6. The method of claim 1 wherein the polymer composite layer contains one or more layers each made by one of the following materials: acrylic resins, polyester, polyethylene (PE), polypropylene (PP), copolymer of PE and PP, ethylene-styrene copolymer (ES), cyclo olefin, polyethylene terephthalate (PET), polyvinyl alcohol (PVA), ethylene-vinyl acetate (EVA), ethylene/methacrylic acid

(E/MAA)ionomer, polyethylene naphthalate (PEN), polyether ether ketone (PEEK), polycarbonate (PC), polysulfone, polyimide (PI), polyacrylonitrile (PAN), styrene acrylonitrile (SAN), polyurethane (PU), synthetic papers, glassine papers, or polyolefin coated paper.

- [c7] 7. The method of claim 1 wherein the sealing process is performed using a heat activating process, an ultrasonic pressing process, a zipper, a ziplock, a sliding zipper or an adhesive.
- [c8] 8. The method of claim 1 wherein at least two overlapping edges are sealed in the sealing process so as to form an opening in the air permeable packaging bag.
- [c9] 9. The method of claim 1 wherein at least one curving edge is sealed in the sealing process so as to form an opening in the air permeable packaging bag.
- [c10] 10. The method of claim 1 wherein the method of closing the opening of the air permeable packaging bag uses a zipper, a ziplock, a sliding zipper, a heat activating process, an ultrasonic pressing process, or an adhesive.
- [c11] 11. A method of manufacturing an air permeable packaging bag, the method comprising:
providing two polymer composite layers, at least one of the two polymer composite layers comprising a plurality

of gaps formed by virtue of an impression process; overlapping the two polymer composite layers; and performing a sealing process to seal the overlapping edge of the two polymer composite layers so as to form an opening of the air permeable packaging bag.

- [c12] 12. The method of claim 11 wherein the method further comprises a step of forming a sealing layer on the surface of the polymer composite layer.
- [c13] 13. The method of claim 12 wherein the sealing layer is formed after the impression process, and the sealing layer formed on the polymer composite layer fills the gaps of the polymer composite layer to prevent air permeation.
- [c14] 14. The method of claim 12 wherein the sealing layer is performed before the impression process, and the method further comprises a thermal process to soften the sealing layer after the impression process, so that the sealing layer can fill the gaps in the polymer composite layer to prevent air permeation.
- [c15] 15. The method of claim 12 further comprising a second coating process to form a second sealing layer on the other side of the polymer composite layer.
- [c16] 16. The method of claim 11 wherein the polymer com-

posite layer contains one or more layers each made by one of the following materials: acrylic resins, polyester, polyethylene (PE), polypropylene (PP), copolymer of PE and PP, ethylene-styrene copolymer (ES), cyclo olefin, polyethylene terephthalate (PET), polyvinyl alcohol (PVA), ethylene-vinyl acetate (EVA), ethylene/methacrylic acid (E/MAA)ionomer, polyethylene naphthalate (PEN), poly ether ether ketone (PEEK), polycarbonate (PC), polysulfone, polyimide (PI), polyacrylonitrile (PAN), styrene acrylonitrile (SAN), polyurethane (PU), synthetic papers, glassine papers, or polyolefin coated paper.

- [c17] 17. The method of claim 11 wherein at least two overlapping edges are sealed in the sealing process so as to form an opening in the air permeable packaging bag.
- [c18] 18. The method of claim 11 wherein at least one curving edge is sealed in the sealing process as to form an opening in the air permeable packaging bag.
- [c19] 19. The method of claim 11 wherein the sealing process is performed using a heat activating process, an ultrasonic pressing process, or an adhesive.
- [c20] 20. The method of claim 11 wherein the method of closing the opening of the air permeable packaging bag uses a zipper, a ziplock, a sliding zipper, a heat activating

process, an ultrasonic pressing process, or an adhesive.